The Monetary Policy Implications of Market Reforms and Trade Integration

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CEPR-RIETI Workshop
"New Challenges to Global Trade and Finance"
RIETI, Tokyo, October 8, 2013

Introduction

- A frequent statement in policy circles: Market reforms that facilitate product creation and enhance labor market flexibility would be beneficial for rigid economies, such as those of several European countries.
  - More flexible markets would foster more rapid recovery from recessions and, in general, would result in better economic performance.
  - Deregulation of product markets would accomplish this by boosting business creation and enhancing competition;
  - Deregulation of labor markets would do it by facilitating reallocation of resources and speeding up the adjustment to shocks.

Introduction, Continued

- Results in the academic literature support these arguments.
  - Blanchard and Giavazzi (2003), Cacciatore and Fiori (2011), Dawson and Seater (2011), Ebell and Haefke (2009), and several others.
- But the implementation of market reforms that alter important characteristics of a wide set of European countries would have implications that extend beyond Europe.
- The reforms would have consequences for the optimal conduct of macroeconomic policy in Europe and, potentially, outside.
- The same can be said of increased trade integration between Europe and its partners.

This Presentation

- I will present results on the macroeconomic and monetary policy consequences of market reforms and trade integration from a research agenda with Matteo Cacciatore.

- Two papers: The paper that was distributed (focusing mostly on market reforms) and a companion paper (focusing on trade integration).

- Results obtained using a two-country, dynamic, stochastic, general equilibrium model with heterogeneous firms, endogenous producer entry into domestic and export markets, and labor market frictions.

- The model builds on Ghironi and Melitz (2005—international trade and macro dynamics with heterogeneous firms) and Cacciatore's (2010) extension to incorporate search-and-matching labor market frictions.

- We augment the framework by introducing sticky prices and wages, and a role for monetary policy.

- The (calibrated) model successfully reproduces several features of the (U.S. and Euro Area) business cycle.

International Trade and the Macroeconomy

- **Experiment 1. Trade Integration:** Lower (iceberg) trade costs to levels consistent with post-1980s trade volumes.

- Trade integration reallocates market share toward more productive firms, and it increases business cycle synchronization across countries.
  - Consistent with empirical evidence (Frankel and Rose, 1998, and Clark and van Wincoop, 2001) that poses challenge to standard open economy New Keynesian models without "deep" trade features (Faia and Monacelli, 2008, Pappa, 2004, others).

International Trade and Monetary Policy

- When trade linkages are weak, (Ramsey) optimal, cooperative policy is inward-looking, but it requires significant departures from price stability both in the long run and over the business cycle.

- As trade integration reallocates market share toward more productive firms, optimal long run inflation falls.

- Increased business cycle synchronization implies that country-specific shocks have more global consequences.

- The constrained efficient allocation generated by optimal cooperative policy can still be achieved by appropriately designed inward-looking policy rules, but sub-optimal (historical) policy implies inefficient fluctuations in cross-country demands that result in large welfare costs when trade linkages are strong.
  - Benigno and Benigno (2003).

Market Reforms and the Macroeconomy

- **Experiment 2. Market Reforms:** Euro Area producer entry costs, unemployment benefits, worker bargaining power lowered to U.S. levels.

- Reforms result in increased domestic producer entry and lower unemployment at home and abroad, but a worse domestic external balance, at least for some time.

- By putting upward pressure on labor costs, producer entry implies stronger terms of trade during much of the transition.
  - Corsetti, Martin, and Pesenti (2013).

Market Reforms and Monetary Policy

- When regulation is high, (Ramsey) optimal, cooperative policy requires significant departures from price stability both in the long run and over the business cycle (as in the case of low trade).

- Adjustment to market reforms requires expansionary policy to reduce transition costs, but deregulation reduces static and dynamic inefficiencies, making price stability more desirable at home and abroad once the transition is complete.

- Optimal cooperative monetary policy maximizes the benefits of market reforms at home and abroad, with non-negligible welfare gains relative to historical policy behavior.
  - We follow Sims (2007) in considering historical behavior a more realistic benchmark for comparison than optimal, non-cooperative policies.

Related Literature

- Market reforms and the macroeconomy: Bertinelli, Cardi, and Sen (2013), Blanchard and Giavazzi (2003), Cacciatore and Fiori (2011), Dawson and Seater (2011), Ebell and Haefke (2009), Felbermayr and Prat (2011), Fiori, Nicoletti, Scarpetta, and Schiantarelli (2012), Griffith, Harrison, and Macartney (2007), and Messina and Vallanti (2007).
  - Closed economy.
- Market reforms and macro policy: Barkbu, Rahman, Valdés, and Staff (2012), Eggertsson, Ferrero, and Raffo (2013), Fernández-Villaverde, Guerrón-Quintana, and Rubio-Ramírez (2011).
  - No deep modeling of producer entry dynamics and labor market frictions.
- Optimal monetary policy and producer entry: Cacciatore, Fiori, and Ghironi (2013), Bergin and Corsetti (2008, 2013), Bilbiie, Fujiwara, and Ghironi (2011), Faia (2010), Lewis (2010).
  - Mostly closed economy. Bergin and Corsetti (2013) exception.

Related Literature, Continued

- Monetary transmission and optimal monetary policy in New Keynesian models:
  - Labor market frictions: Arseneau and Chugh (2008), Faia (2009), Thomas (2008).
  - Price stability in open economies: Benigno and Benigno (2003, 2006), Catão and Chang (2012), Galí and Monacelli (2005), Dmitriev and Hoddenbagh (2012), many others.
  - Do not feature mechanisms we focus on.

- Krugman's (1995) call: "I would like to know how the macroeconomic model that I more or less believe can be reconciled with the trade models that I also more or less believe. [...] What we need to know is how to evaluate the microeconomics of international monetary systems. Until we can do that, we are making policy advice by the seat of our pants."

Margins and Distortions

- The worldwide Ramsey planner uses its policy instruments (Home and Foreign interest rates in the model) to address the consequences of a set of distortions.

- I will not go into the details of the model, but I will summarize the sources of inefficiency with reference to the margins on which they impinge.

- Price and wage stickiness, firm monopoly power, positive unemployment benefits, “red tape” regulation, and incomplete asset markets affect four margins of adjustment and the resource constraint for consumption output in the market economy.

1. Product Creation Margin

- Sticky prices result in inefficient time-variation and lack of synchronization of domestic and export markups that introduce inefficiency in the product creation margin (described by the Euler equations for product creation at Home and abroad).
  - Time variation and lack of synchronization of markups across markets imply inefficient deviations of the monopoly profit incentive for product creation (the markup) from the welfare benefit of product variety determined by the constant elasticity of substitution across products.

- Moreover, the product creation margin is affected by the presence of the non-technological entry costs.

- The Euler equations for domestic and foreign product creation coincide with those of the first-best environment only when prices and wages are flexible and there is no “red tape.”

2. Job Creation Margin

- This margin of adjustment is described by the Euler equations for job creation in the two countries.

- Monopoly power in the final consumption sector distorts the job creation decision by inducing a suboptimally low return from vacancy posting in the intermediate sector.
  - Price stickiness impacts this departure from efficiency by inducing endogenous markup variation.

- Failure of the Hosios condition (for which equality of the firm's bargaining share and the vacancy elasticity of the matching function is necessary for efficiency) is an additional distortion in this margin.
  - This is affected both by the flexible-wage value of the bargaining share and the presence of wage stickiness, which induces time variation of the bargaining share.
    - Sticky wages are sufficient to generate a wedge between private and social returns to vacancy posting.

- Sticky wages distort job creation also by affecting the outside option of firms through the cost of wage adjustment.

- Finally, unemployment benefits increase the workers' outside option above its efficient level.

3. Labor Supply Margin

- With endogenous labor supply, monopoly power in product markets induces a misalignment of relative prices between consumption goods and leisure.
  - This is the distortion that characterizes standard New Keynesian models without labor market frictions and endogenous product dynamics.

- Sticky prices induce time variation of this distortion.

4. Cross-Country Risk Sharing Margin

- Incomplete markets imply inefficient risk sharing between Home and Foreign households:
  - The ratio of marginal utilities of consumption at Home and abroad is not tied to the welfare-based real exchange rate.

- The departure of consumption dynamics from the perfect risk sharing outcome is also affected by costs of adjusting bond holdings.

Resource Constraint

- Sticky prices and wages and the non-technological portion of product creation costs imply inefficient diversion of resources from consumption and creation of new products and vacancies.

Trade Costs and the Export Entry Margin

- Implicit in the discussion above is that all trade costs in our model are treated as determined by trade technology—i.e., they are not the result of trade barriers and (sub-optimal) trade policy.

- If we allow for part of fixed and iceberg trade costs to be the result of trade barriers and sub-optimal trade policy, then these costs also create distortions.

- They distort the export entry margin and, by impacting the profitability of firms, they impact the product creation margin.

- Note: Introducing this interpretation would not change our results—we would simply be viewing trade integration as a reduction of policy-induced impediments to trade.

The Role of Monetary Policy

- The market allocation is efficient only if *all* the distortions are zero at all points in time.
- We abstract from optimal fiscal policy, and we allow for asymmetric shocks.
- Hence, we work in a second-best environment in which the efficient allocation cannot be achieved.
- The worldwide Ramsey central bank of the optimal, cooperative scenario uses its leverage on the economies via the sticky-price and sticky-wage distortions, trading off their costs against the possibility of addressing the distortions that characterize the market economy under flexible wages and prices.

Some Intuition for Results

- Optimal policy uses inflation to narrow inefficiency wedges relative to the efficient allocation along the economies' margins of adjustment.

- For instance, positive long-run inflation pushes job creation closer to the efficient level by eroding markups and reducing worker bargaining power in the presence of sticky wages.

- Market reform reduces the need for inflation to accomplish this.

- Similarly, the reallocation of market share that is implied by trade integration results in an endogenous increase in average firm productivity.

- This makes job matches more valuable and pushes employment toward the efficient level, reducing the need for average inflation to accomplish this.

- The incentive to use inflation over the business cycle is similarly determined by the tradeoffs across domestic and international distortions (which imply more active optimal monetary policy in the relatively more distorted economy).

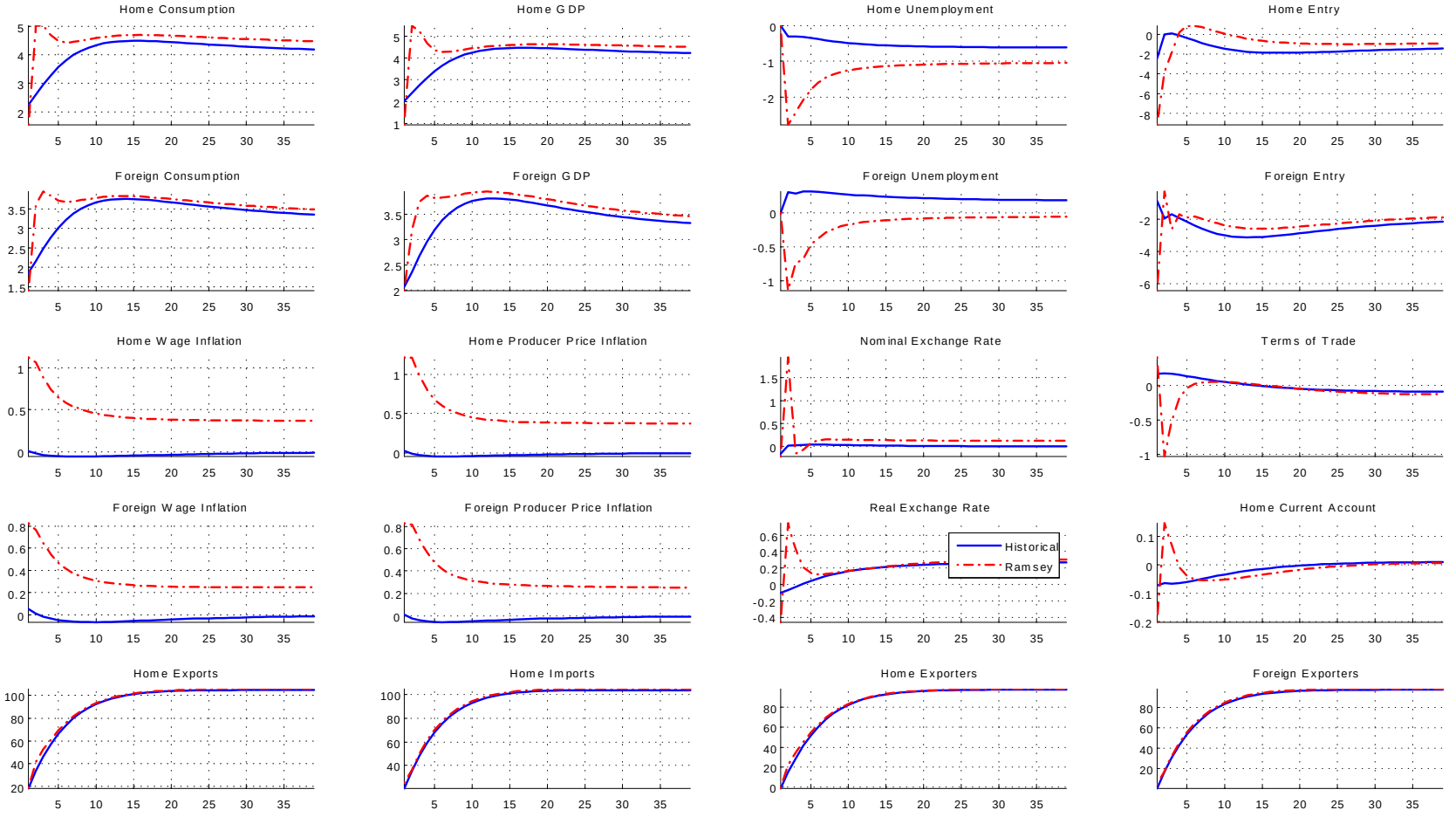
CALIBRATION

Risk Aversion	$\gamma_C = 1$
Frisch Elasticity	$1/\gamma_h = 0.4$
Discount Factor	$\beta = 0.99$
Elasticity Matching Function	$\varepsilon = 0.4$
Flexible-Wage Firm Bargaining Power	$\eta = 0.4$
Unemployment Benefit	$b = 0.21$
Exogenous Worker Separation	$\lambda = 0.10$
Vacancy Cost	$\kappa = 0.10$
Matching Efficiency	$\chi = 0.73$
Elasticity of Substitution	$\theta = \phi = 3.8$
Plant Exit	$\delta = 0.026$
Pareto Shape	$k_p = 3.4$
Pareto Support	$z_{\min} = 1$
Sunk Entry Cost	$f_e = 0.57$
Fixed Export Costs	$f_x = 0.005$
Iceberg Trade Costs	$\tau = 1.88$
Wage Adjustment Cost	$\vartheta = 80$
Price Adjustment Cost	$\nu = 80$
Bond Adjustment Cost	$\psi = 0.0025$
Historical Policy, Interest Rate Smoothing	$\varrho_i = 0.71$
Historical Policy, Inflation	$\varrho_\pi = 1.62$
Historical Policy, GDP Gap	$\varrho_Y = 0.34$
Productivity Persistence	$\Phi_{11} = \Phi_{22} = 0.999$
Productivity Spillover	$\Phi_{12} = \Phi_{21} = 0$
Productivity Innovations, Standard Deviation	0.0068
Productivity Innovations, Correlation	0.253

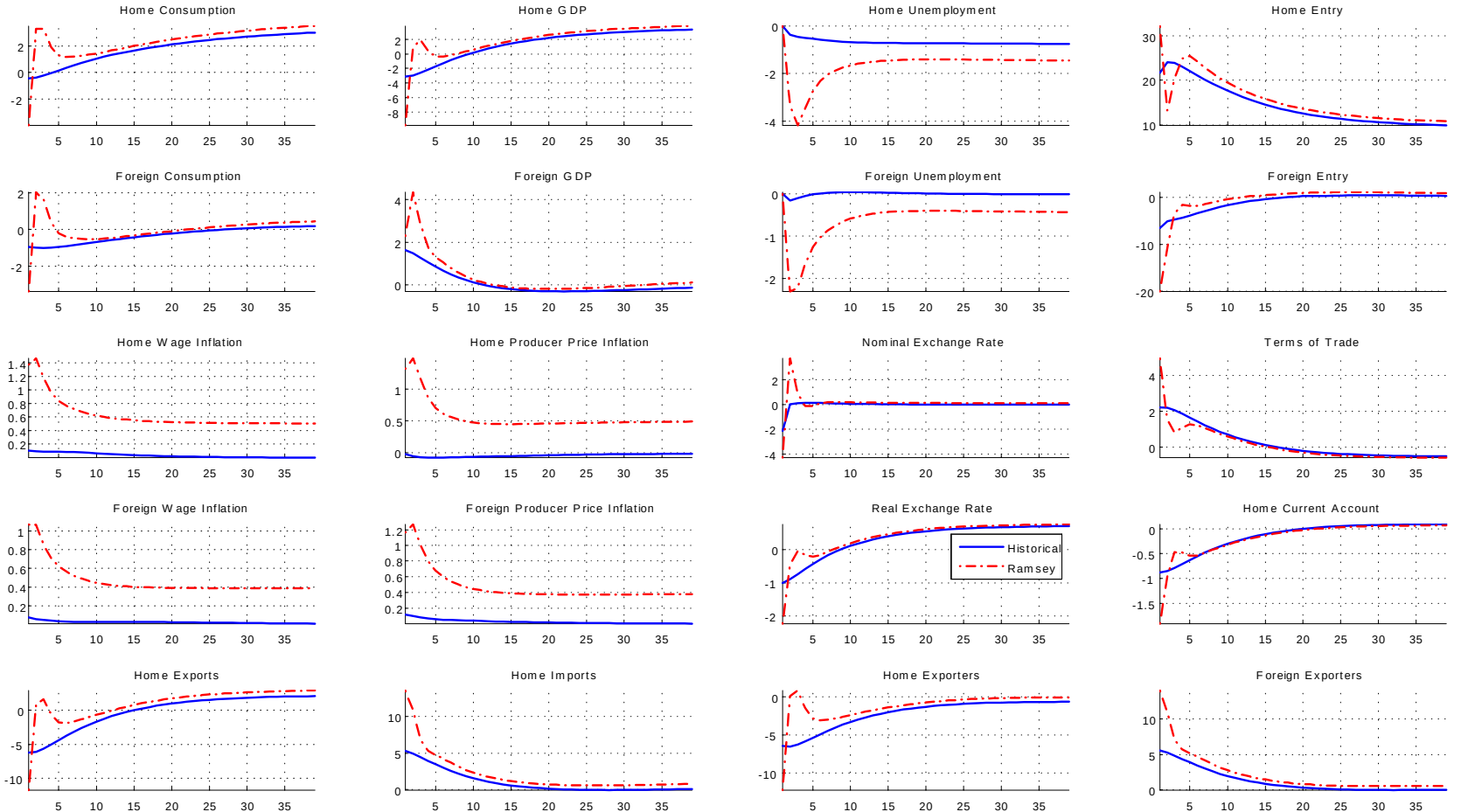
BUSINESS CYCLE STATISTICS

Variable	$\sigma_{X_R^U}/\sigma_{Y_R^U}$		1st Autocorr.			$corr(X_{R,t}^U, Y_{R,t}^U)$
Y_R	**1**	1	**0.83**	0.74	**1**	1
C_R	**0.64**	0.88	**0.70**	0.72	**0.67**	0.95
I_R	**3.20**	5.34	**0.89**	0.73	**0.87**	0.60
U	**6.40**	6.40	**0.88**	0.76	**-0.86**	-0.70
w_R	**0.52**	0.66	**0.91**	0.93	**0.56**	0.80
X_R	**3.18**	2.33	**0.67**	0.67	**0.18**	0.23
IM_R	**2.54**	2.18	**0.32**	0.66	**0.70**	0.77
TB_R/Y_R	**0.14**	0.36	**0.43**	0.70	**-0.47**	-0.31
$corr(C_{R,t}, C_{R,t}^*)$	**0.44**	0.12				
$corr(Y_{R,t}, Y_{R,t}^*)$	**0.51**	0.53				

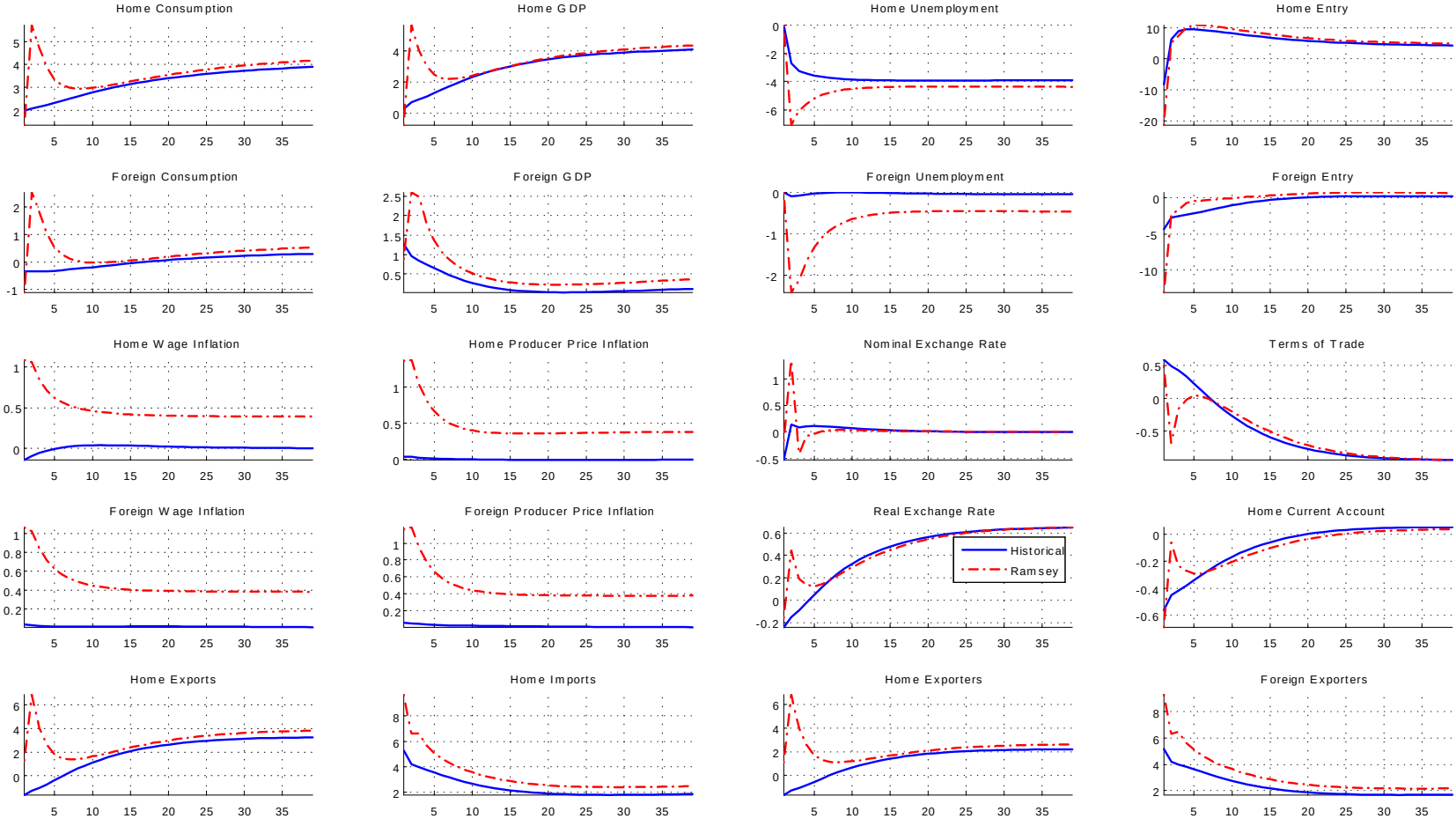
Bold fonts denote U.S. data moments, normal fonts denote model-generated moments.



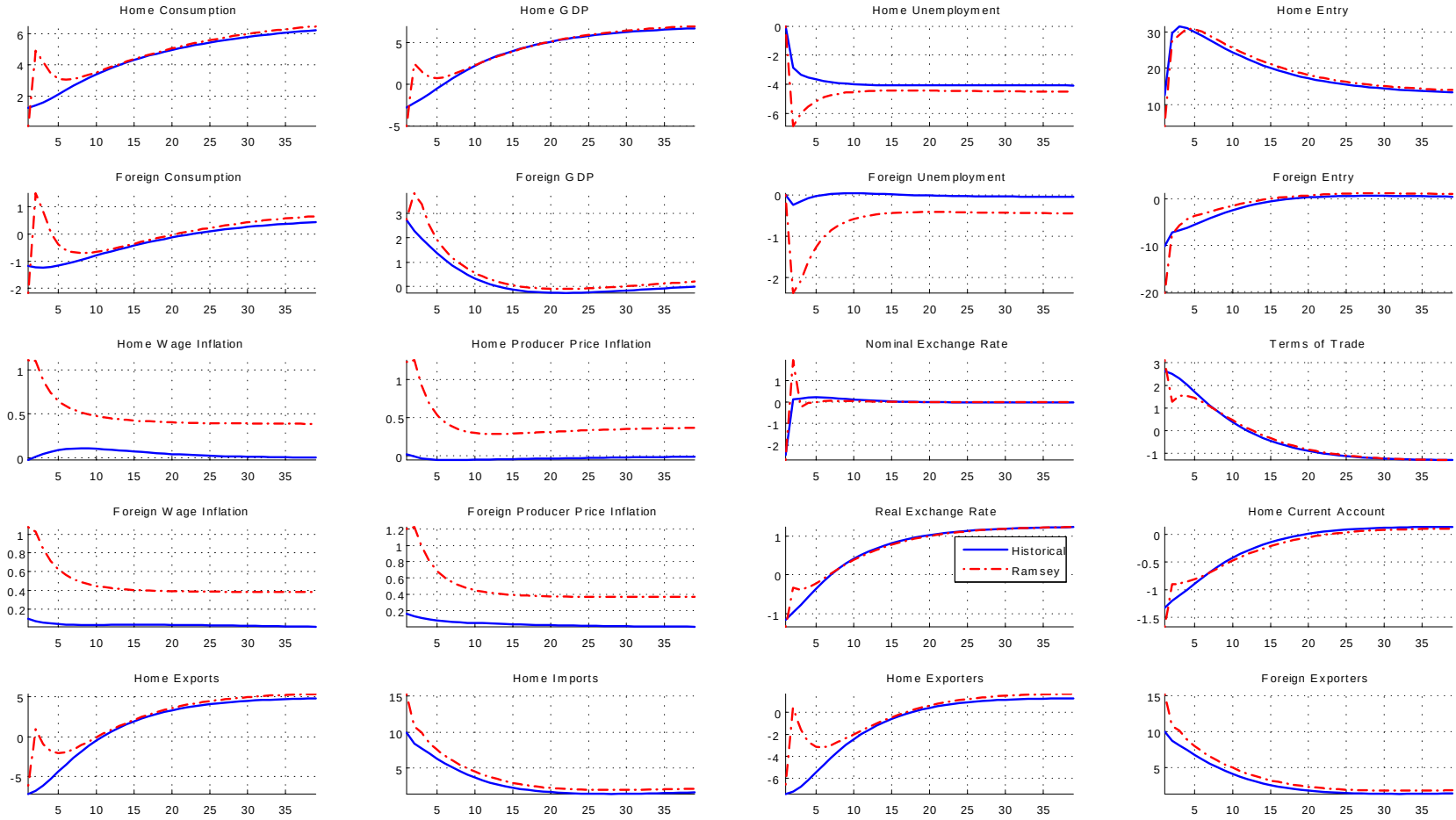
Trade Integration, Asymmetric Countries, Historical Policy (Solid) versus Optimal Policy (Dashed).



Home Product Market Deregulation, Flexible Regulation in Foreign, High Trade, Historical Policy (Solid) versus Optimal Policy (Dashed).



Home Labor Market Deregulation, Flexible Regulation in Foreign, High Trade, Historical Policy (Solid) versus Optimal Policy (Dashed).



Home Product and Labor Market Deregulation, Flexible Regulation in Foreign, High Trade, Historical Policy (Solid) versus Optimal Policy (Dashed).

WELFARE EFFECTS OF REFORMS, STEADY STATE, HIGH TRADE

Market Reform	ΔWelfare (Historical)		ΔWelfare (Peg)		ΔWelfare (Ramsey)		Ramsey Inflation	
	Home	Foreign	Home	Foreign	Home	Foreign	Home	Foreign
Status Quo (Flexible Partner)	0%	0%	0%	0%	0.53%	0.27%	2.07%	1.55%
Asymmetric PMR	3.41%	0.08%	3.41%	0.08%	3.89%	0.35%	2.01%	1.54%
Asymmetric LMR	3.95%	0.23%	3.94%	0.23%	4.22%	0.48%	1.55%	1.53%
Asymmetric JOINT	6.64%	0.28%	6.64%	0.28%	6.91%	0.52%	1.52%	1.52%

Note: PMR ≡ Product Market Reform; LMR ≡ Labor Market Reform;

JOINT ≡ Product and Labor Market Reform; Asymmetric ≡ Home country reform;

ΔWelfare (Historical) ≡ Welfare change under historical policy;

ΔWelfare (Peg) ≡ Welfare change under exchange rate peg (Foreign leader);

ΔWelfare (Ramsey) ≡ Welfare change under Ramsey policy.

WELFARE EFFECTS OF REFORMS, BUSINESS CYCLE, HIGH TRADE

Market Reform	Welfare Cost (Historical)		Welfare Cost (Peg)		Welfare Cost (Ramsey)	
	Home	Foreign	Home	Foreign	Home	Foreign
Status Quo (Flexible Partner)	2.37%	1.15%	2.42	1.15	2.033%	0.92%
Asymmetric PMR	1.95%	1.12%	1.98%	1.12%	1.62%	0.89%
Asymmetric LMR	1.10%	1.07%	1.14%	1.07%	0.87%	0.85%
Asymmetric JOINT	1.08%	1.06%	1.12%	1.06%	0.85%	0.85%

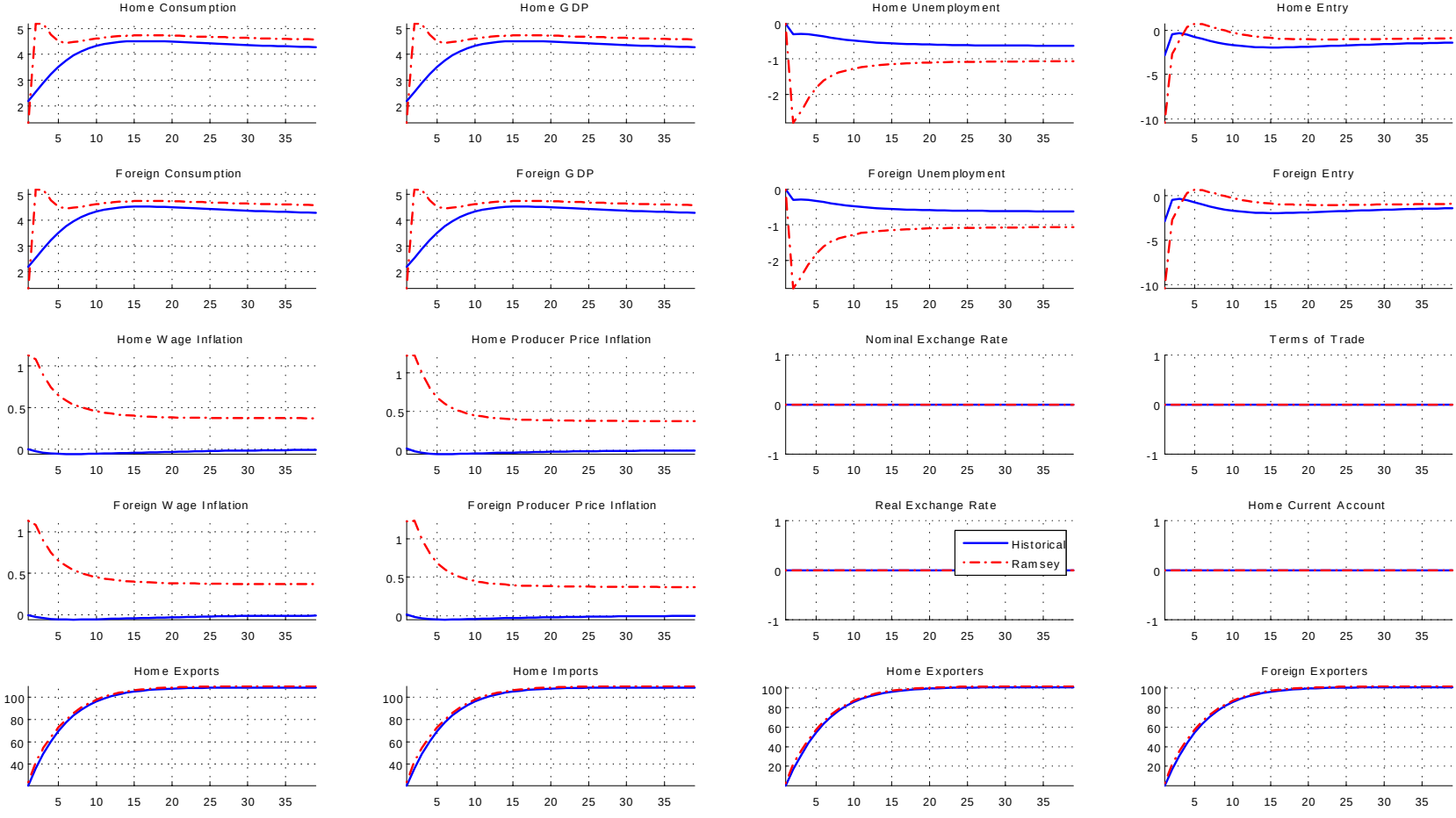
Note: PMR $\equiv$ Product Market Reform; LMR $\equiv$ Labor Market Reform;

JOINT $\equiv$ Product and Labor Market Reform; Asymmetric $\equiv$ Home country reform;

Welfare Cost (Historical) $\equiv$ Welfare cost of business cycles under historical policy;

Welfare Cost (Peg) $\equiv$ Welfare cost of business cycles under exchange rate peg (Foreign leader);

Welfare Cost (Ramsey) $\equiv$ Welfare cost of business cycles under Ramsey policy.



Trade Integration, Symmetric Flexible Countries, Historical Policy (Solid) versus Optimal Policy (Dashed).

TABLE 5: TRADE INTEGRATION – NON STOCHASTIC STEADY STATE

	Ramsey Gain	Ramsey Inflation
$\frac{Trade}{GDP} = 0.1$	0.34%	1.40%
$\frac{Trade}{GDP} = 0.2$	0.22%	1.20%
$\frac{Trade}{GDP} = 0.35$	0.16%	1.05%

TABLE 6: TRADE INTEGRATION – NON STOCHASTIC STEADY STATE

Relative Gain from Coordination —PCP

	Optimal Rule	Historical Rule	Peg		Nash
			Leader	Follower	
$\frac{Trade}{GDP} = 0.1$	0.88%	18.62%	18.81%	43.45%	0.0001%
$\frac{Trade}{GDP} = 0.2$	3.13%	25.36%	26.90%	45.40%	0.001%
$\frac{Trade}{GDP} = 0.35$	3.15%	29.69%	32.31%	48.39%	0.09%

Relative Gain from Coordination —LCP

	Optimal Rule	Historical Rule	Peg		Nash
			Leader	Follower	
$\frac{Trade}{GDP} = 0.1$	2.17%	20.91%	20.89%	44.90%	0.10%
$\frac{Trade}{GDP} = 0.2$	2.66%	29.09%	29.49%	47.34%	0.90%
$\frac{Trade}{GDP} = 0.35$	3.16%	36.16%	37.00%	51.97%	2.42%

Note: gains are the percentage reduction in welfare costs of business cycle under the Ramsey-optimal policy.

TABLE 7: TRADE INTEGRATION AND GDP COMOVEMENT

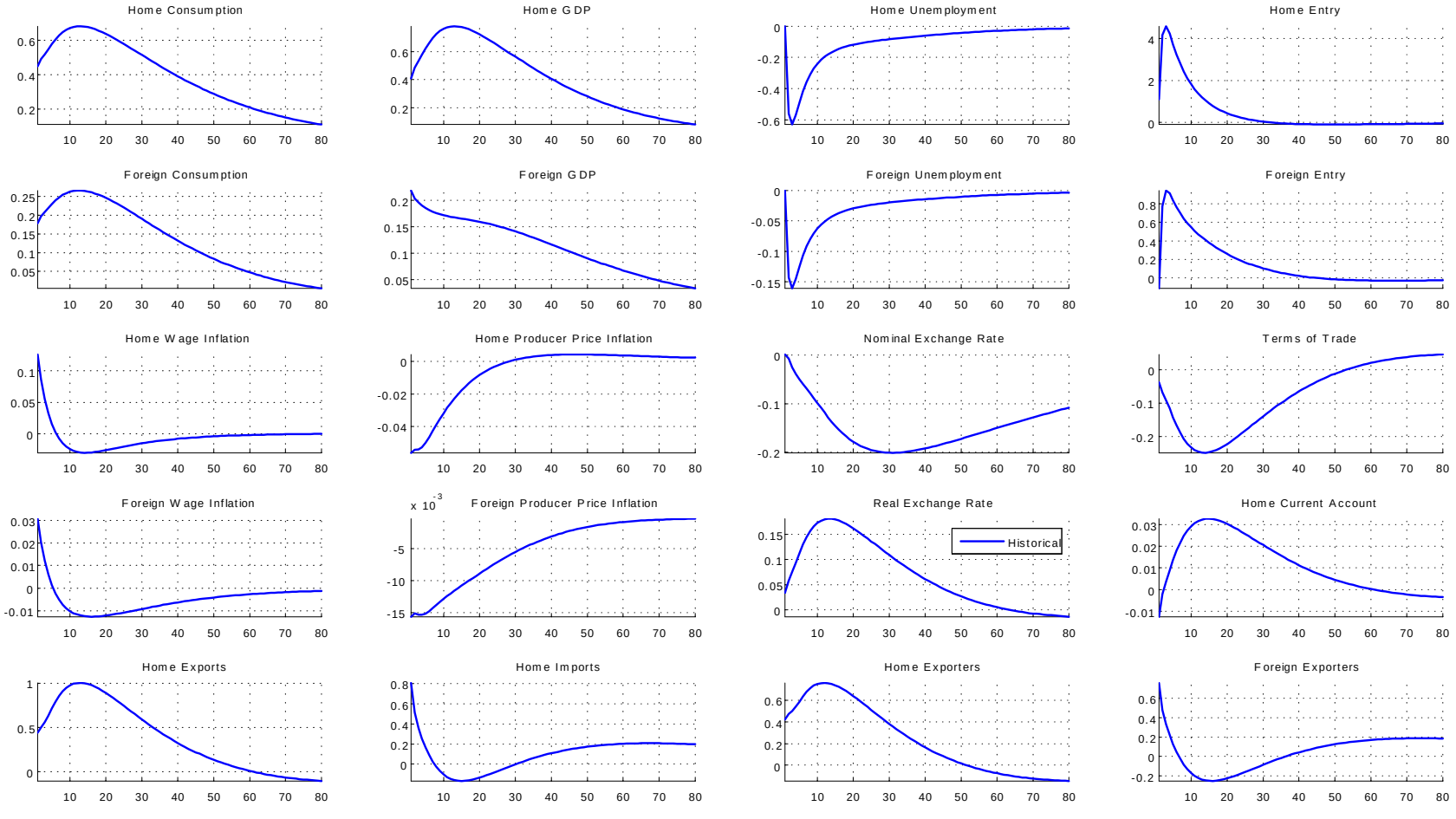
	$\Delta corr(Y_{R,t}, Y^*_{R,t})$—Producer Currency Price		
	$\frac{Trade}{GDP} = 0.1$	$\frac{Trade}{GDP} = 0.2$	$\frac{Trade}{GDP} = 0.35$
Historical Rule	0.36	0.45	0.49
Peg	0.05	0.19	0.27
Ramsey	0.07	0.29	0.43
Nash	0.28	0.35	0.48
	$corr(Y_{R,t}, Y^*_{R,t})$—Local Currency Price		
	$\frac{Trade}{GDP} = 0.1$	$\frac{Trade}{GDP} = 0.2$	$\frac{Trade}{GDP} = 0.35$
Historical Rule	0.33	0.42	0.47
Peg	0.05	0.20	0.27
Ramsey	0.36	0.53	0.62
Nash	0.28	0.36	0.42

Conclusions

- Changes in economic structure implied by market reforms and trade integration have important implications for the macroeconomy and monetary policy.

- There are sizable gains for trade partners from the implementation of optimal, cooperative policies relative to historical behavior.

- The benefits of market reforms in the Euro Area will be maximized, domestically and abroad, if policies are adjusted cooperatively to the new environment in which they operate.



Home Productivity Shock, Flexible Regulation, Historical Policy.

TABLE 4: CALIBRATION

	Parameter	Source/Target
Risk Aversion	$\gamma_C = 1$	Literature
Frisch elasticity	$1/\gamma_h = 0.4$	Literature
Discount Factor	$\beta = 0.99$	$r = 4\%$
Elasticity Matching Function	$\varepsilon = 0.4$	Literature
Firm Bargaining Power	$\eta = 0.4$	Literature
Home Production	$b = 0.54$	Literature
Exogenous separation	$\lambda = 0.10$	Literature
Vacancy Cost	$\kappa = 0.16$	$s = 60\%$
Matching Efficiency	$\chi = 0.68$	$q = 70\%$
Elasticity of Substitution	$\theta = 3.8$	Literature
Plant Exit	$\delta = 0.026$	$\frac{JD^{EXIT}}{JD} = 40\%$
Pareto Shape	$k_p = 3.4$	Literature
Pareto Support	$z_{\min} = 1$	Literature
Sunk Entry Cost	$f_e = 0.69$	Literature
Fixed Export Costs	$f_x = 0.005$	$(N_x/N) = 21\%$
Iceberg Trade Costs	$\tau = 1.75$	$(I + X)/Y = 10\%$
Rotemberg Wage Adj. Cost	$\vartheta = 60$	$\frac{\sigma_l}{\sigma_{Y_R}} = 0.56$
Rotemberg Price Adj. Cost	$\nu = 80$	Literature
Taylor - Interest Rate Smoothing	$\varrho_i = 0.71$	Literature
Taylor - Inflation Parameter	$\varrho_\pi = 1.62$	Literature
Taylor - Output Gap Parameter	$\varrho_Y = 0.34$	Literature
Bond Adjustment Cost	$\psi = 0.0025$	Literature